

LESSON PLAN EXERCISES

Introduction & Theme: This month's lesson plans are based on the value of Accuracy.

ACCURACY: RELATED VALUES

LOVE:

Acceptance, Care, Dedication, Devotion, Empathy, Friendship, Reverence, Sacrifice, Thoughtfulness.

TRUTH:

ACCURACY, Curiosity, Discernment, Fearlessness, Honesty, Integrity, Intuition, Justice, Purity, Quest for knowledge, Reason, Self-analysis, Self-awareness, Truthfulness, Unity of thought, words and deed.

RIGHT CONDUCT:

Ethical Skills: Code of Conduct, Courage, Dependability, Determination, Duty, Efficiency, Initiative, Perseverance, Punctuality, and Responsibility.

PEACE: Attention, Calm, Concentration, Focus, Gratitude, Humility, Reflection, Satisfaction, Self-control, Self-discipline, Self-respect, Understanding.

NON-VIOLENCE:

Psychological: Concern for Others, Morality.

COMMENTARY:

According to the *Webster's Dictionary*, ACCURACY means freedom from mistake or error; conformity to truth or to a standard or model and exactness. In the *Chambers Thesaurus*, the noun ACCURACY is defined as correctness, precision, exactness, authenticity, truth, veracity, closeness, faithfulness, fidelity and carefulness. The value of ACCURACY is one that embraces a large area and has many implications.

Pupils can be encouraged to demonstrate ACCURACY in their behaviour through the medium of praise and other incentives. ACCURACY can cover telling the truth and not exaggerating, as well as taking care over one's work. Children who are careless with their work, who lie or are dishonest often exert a very negative pressure on their peers. Pupils may be influenced to follow such behaviour despite their own value-based upbringing, especially if those pupils are quite charismatic or dominant. Some schools have found that setting up "parenting" meetings to address this issue, have been very helpful. (For those interested, to find out more about parenting strategies please go to the SSEHV Web site.)

In association with exploring the value of ACCURACY, teachers, parents and carers could also encourage questioning of stereotyped images. They could look at the problems involved in overcoming these stereotyped images and could reflect upon ways in which they could provide resources of relatively unbiased information to improve knowledge and understanding.

QUOTES

Truth is that which is the same for each person and at all times and places.

Sathya Sai

The truth will set you free.

Know thyself.

Oracle at Delphi

Be yourself truthful.

Those who seek the Truth by means of intellect and learning only get further and further away from it.

Poau/Obaku circa 850

Not knowing how near the Truth is, people seek it far away. What a pity! They are like him who, in the midst of water, cries in thirst so imploringly.

Hakuin 1683-1768

Let knowledge grow from more to more and thus be human life enriched.

Encyclopaedia Britannica

STORY

Sliggle Snake Wants Legs

by Gay Sayer

Sliggle Snake wanted legs. He went everywhere and asked everyone, "Have you got some legs for me?"

"No," they all said.

Sliggle had always lived in the Water Soup Jungle. He could swim and he often sliggled around the swamp giving the water rats a fright when they were having a bath. Sliggle thought this was great fun.

He was a handsome snake with orange and purple diamond marks all the way down his jet black back. His nose was a golden colour and sometimes his eyes glowed very green, especially if he was hungry.

But this morning Sliggle's eyes weren't glowing. "I'm depressed," he said to himself. "I wish I had legs. I bet I would feel better with legs."

Just at that moment, out of the bushes came Hooper. He was an ant eater and he made a lot of noise.

"Excuse me," shouted Sliggle above the noise, "But can you get me some legs like yours please?"

"Certainly not!" came the reply. "What does a snake want with legs?"

"It would make me feel better."

"Tsk, tsk!" said Hooper, "Anyway, my legs wouldn't fit you." And he ploughed off through the bushes.

Next Sliggle came across a Hut. "Have you any legs inside for me?" he called.

But the Hut said legs were unnecessary as he was perfectly happy as he was and never wanted to be anywhere but right here. In fact, if he had legs, he might not have been right here at this exact moment to enjoy such nonsense as a snake wanting legs. The hut said watching things go by was a lot of fun for no effort at all!

Sliggle continued on. He asked the Bush Buck for legs, but the Bush Buck was too busy running away in fright to even reply to Sliggle. He asked the Water Sprite, but she just beamed him a lovely smile (which made Sliggle stretch his neck to show off his diamond back). She didn't offer him any legs so on he went. He asked the Ginko Tree who advised against it but suggested that if he really wanted to have legs he might try asking the Spaghetti Plant.

"The Spaghetti Plant! Why didn't I think of that?"

"Because you were too busy thinking," said Ginko.

So Sliggle sliggled as fast as he could over to the Pasta Pasture where the Spaghetti Plants lived.

“Oh, Mrs Spaghetti Plant,” he puffed. “Can you give me some legs? Old Ginko said you could.”

“Well, it is true and Ginko is a very wise old tree,” she said smiling. “If you coil up beside me and eat some of my leaves, you’ll grow spaghetti legs”.

“Yeah, great idea!” said Sliggle, and he started eating the leaves as fast as he could. In fact, just to make sure, he ate them all! “Yum, delicious!” he declared when he had finished.

“But where are my legs?” Now he had a very big tummy and it wasn’t long before he was fast asleep.

Much, much later, after a long, long sleep, Sliggle woke up. He felt very odd. What a tangle he was in! There were legs everywhere. What a tangle! Oh dear!

“Help!” shouted Sliggle, “Help!” But no one came.

Slowly and with lots of muddles he started to untangle his new spaghetti legs. It wasn’t as easy as he thought but he was very excited and wanted to show all his friends his new legs – if only he could untangle them. There were so many of them, “I don’t know where to start”.

So Sliggle sat and counted his new legs. “Hmm,” he mumbled eyeing the tangle, “One, two, what a mess! I can’t find number three leg. Oh, here’s one end. Now where’s the middle of it?” And he gave it a tug.

“Ouch!” yelled someone from under the legs.

“Who was that?” Sliggle was very surprised as he couldn’t see anyone under his legs.

“That was me!” came an indignant voice.

“Oh! And who are you?” he asked?

“I am Number Six Leg” said the voice importantly.

“Oh, I’m sorry I thought you were Number Three Leg, I’ve lost him”.

“That,” said Number Six Leg, pointing, “is Number Three Leg.”

Soon he had all the legs untangled (with the help of Number Six Leg of course). “Now I shall get onto my new legs at last,” he thought, as he lay there with all his legs spread out flat on the ground around him.

But it wasn’t that easy, no sooner had he got Number One and Number Two Legs up than Number One Leg went flop and Sliggle fell flat on his face. “At this rate I’ll never get anywhere!” He was starting to get annoyed with his legs. They were all floppy! It was not at all what he had expected. “Perhaps legs weren’t such a good idea after all,” he muttered.

“Well it’s too late now!” bellowed Number Six Leg, “You should have thought of that before.”

Sliggle sat feeling miserable and sorry for himself and thought about all the things he’d been told by the inhabitants of Water Soup Jungle on his way to Mrs Spaghetti Plant. He’d thought he would feel so happy with some legs, but he wasn’t at all happy. In fact he was more unhappy than ever. Perhaps Hooper had been right after all; a snake doesn’t need legs. And the Hut had said he had much more fun without them. And Ginko had definitely thought it unnecessary, but he was too old and wise to say so.

“I’d better talk to Mrs Spaghetti Plant again,” thought Sliggle, and he looked up to get her attention.

When Mrs Spaghetti heard his story, she laughed and laughed. “Oh dear! Of course they don’t work! They’re spaghetti legs and you are a snake, and snakes don’t need legs, silly! I liked your sense of adventure and Old Ginko did too otherwise he would not have sent you over to me. And it was very original for a snake to want legs, so I’m afraid I couldn’t resist helping you. But now that you have tried them and experienced legs, tell me, which do you prefer – legs or no legs?”

“Definitely no legs!” he said with feeling.

“Okay,” she said, “no legs it’ll be. But getting rid of the legs is a little bit more difficult than getting them”.

“That’s okay, I just want to be a snake again with no legs ever again.”

“Right coil up over there by that rock,” she directed and he dragged himself, with great difficulty to the rock. Almost immediately he started to have tummy pains. “Oh no”, he moaned, “I think I’m going to be sick”. And he was. Very sick. Very, very sick. In fact, the sickest he had ever been. And he made an amazing mess, and got all tangled and hot and bothered, But then, at last, he fell asleep.

Mrs Spaghetti, watched over him while he slept and the twigs and bushes cleared up the mess keeping some clothes pegs on their noses for the worst bits.

After a long and lovely sleep Sliggle woke up, stretched and sliggled in the sand and had a rub against the rock. “I feel great,” he declared. He had a nice warm glowing feeling in his tummy and felt wonderfully relaxed. Everything was fresh and bright, much better than he remembered.

“Everything looks a million times more brilliant than before,” he said to Mrs Spaghetti. “What’s happened?”

“What has happened,” she replied, “is that you are happy just being you again, and that makes everyone and everything around you feel great too.”

“This is brilliant” he mused. “And to think I thought having legs was what would make me happy! But in fact I’m much happier being me, just as I am.”

“Well that’s because now you know who you are and you also know you don’t have to be like anyone else except you to be happy . There is a great joy in being you, just like the the Water Sprite and the Ginko Tree and the Hut were all full of joy, just being as they are. It’s the best fun of all, it’s the joy of life. So next time you think you need something to make you feel good, just remember this feeling you have woken up with.”

“Yeah, brilliant! Just, like, just being!” said Sliggle. “Cool, really cool!” and he sniggled off all of a glow.

POEM

The following poem is for junior and secondary levels to stimulate thought and discussion, as well as class work related to the value of ACCURACY.

ACCURACY by Zita Starkie

A is for asking questions when you don't understand
C is for calling a teacher to check your work is right
C is for calmly working without always putting up your hand
U is for understanding like a bright and shining light
R is for remembering to check your work right through
A is for attending to what your teacher says
C is for concentration in everything you do
Y is for you knowing that accuracy pays.

POEM

This poem is for secondary level.

Shining in my ACCURACY by Zita Starkie

Am I really listening?

Or is my mind

Circling

Circling

Circling

Creating Fantasies

.

Am I being carried out

along the ripples

Made by stones

D

R

O

P

P

I

N

G

Into my clear lake

Can I speak my truth

Without elaborate

mind creations

Spinning

Spinning

Spinning

Webs woven from fears.

Can I be still enough

To come from that

precise place

Perfect

Perfect

Perfect

Arrowed to my heart

Can I strip away

Confused clouds

Create clarity

Clear

Clear

Clear

Shining in my ACCURACY.

CURRICULUM SUGGESTIONS

WHOLE SCHOOL:

A day could be set aside as ACCURACY day. The school could prepare for the day by inviting suggestions from the pupils and the staff as to how the day could be marked. A suggestion box could be placed in a prominent place. An honesty box could also be placed beside it to give pupils an opportunity of owning up to having done things, contrary to school rules or to their own conscience. Another box could be placed in the hall where children could place items that they have borrowed and forgotten to return, or that they have stolen from someone.

A short brief during assembly, or from their form teacher, could inspire the children. They could be encouraged to reflect upon the benefits of ACCURACY and be encouraged to demonstrate ACCURACY in their behaviour through the medium of praise and other incentives. The theme of ACCURACY could cover telling the truth and not exaggerating as well as taking care over one's work.. They could honour people who do this and their struggle to communicate ACCURATELY.

A clock could be used as an appropriate symbol to commemorate the day and badges could be presented to pupils who have displayed ACCURACY in their studies or in other related areas, such as telling the truth. Pupils from different years could be asked to talk about the importance of the value of ACCURACY.

The school may want to link this theme with an awareness day on taking extra care with schoolwork, telling the truth, or punctuality. A team could be set up to organise the project and a display could be mounted in the school of instruments that are used for ACCURACY, such as:

- (1) A clock powered by:
 - (a) Battery
 - (b) Water
 - (c) Vegetable
 - (d) Solar power
 - (e) Electromagnetism
 - (f) Caesium
 - (g) Atomic energy (see sections on HISTORY and PHYSICS).
- (2) Meteorological instruments:
 - (a) Thermometer
 - (b) Wind vane
 - (c) Stephenson's screen for keeping meteorological instruments
 - (d) Barometer
 - (e) Hydrometer
- (3) Navigation instruments:
 - (a) Compass
 - (b) Sextant
 - (c) Wind
- (4) Mathematical instruments:
 - (a) Compass
 - (b) Protractor (see DESIGN TECHNOLOGY)

Activities could be set up to mark ACCURACY DAY where pupils would follow instructions or be aware of their actions and surroundings. Suitable examples would be:

- (a) Orientation courses
- (b) Treasure hunts
- (c) Army assault courses,
- (d) Adventure days
- (e) Various sporting activities such as golf and archery
- (f) Steady hand games and computer games involving accuracy

Pupils could talk about the lives of some inspirational people such as Helen Keller (Book 4 lesson 4.10) and Louise Braille (see SSEHV book 5.19), who were blind. Other examples are Leonardo da Vinci and Albert Einstein, who were dyslexic, and Stephen Hawking who suffers from motor neuron disease.

Each form could research a particular person and find out how they overcame tremendous difficulties in order to be able to communicate ACCURATELY with others. The forms could then present their finding to the WHOLE SCHOOL in the form of a talk or play. The school may want to link this with an awareness day on disabilities, focussing in particular on the way people have overcome them and used their disability to spur them on to great achievements. A team could be set up to organise the project. One area that could be highlighted is dyslexia. Pupils could be made aware of the difficulties that dyslexic pupils experience when trying to read and write with ACCURACY.

A useful source for positive material is the book “*Dyslexia*” by Ronald D. Davis. Davis himself suffered from dyslexia and autism but rose above his, so-called, disability to pioneer a revolutionary method for helping to “re-orientate” and “focus” dyslexics and to educate teachers into a new and more positive understanding of dyslexia. By raising awareness about dyslexia, schools would contribute greatly towards supporting many of their own pupils in the challenge with coming to terms and overcoming dyslexia.

Dyslexia Association: Tel: helpline 07702 665799 (ring between 6-9pm).

Other areas that could be explored include:

- (1) Blindness ~ Royal National Institute for the Blind, Head Office and Resource centre, 105 Judd Street, WC1. Tel: 020 7388 1266 01792 655424.
- (2) Deafness ~ Royal National Institute for the Deaf, 19-23, Feather Street, London EC1Y 8SL. Tel: 020 7296 8264. National Deaf Children’s Society, 15 Dufferin Street, London EC1. Freephone helpline (Mon-Fri 10am-5pm 0808 8008880)
- (3) Autism ~ National Autistic Society, 393, City Road, London, EC1V. Tel: 0207 833 2299.
- (4) Cerebral Palsy Association: ~ visit: www.scope.org.uk, Tel: 0808 8003333 or send a stamped addressed envelope to PO Box 833, Milton Keynes, MK125NY.
- (5) Motor Neurone Disease Association ~ PO box 246, Northampton, NN1211. Tel: 01604 250505
- (6) Multiple Sclerosis Society ~ MS National Centre, 372 Edgware Road, Staples Corner, London, NW2 6ND. Tel: 0208 438 0700.
- (7) Paralysis ~ National Stroke Association, Tel: 020 7566 0300
- (8) Alzheimer’s Disease ~ The Alzheimer’s Society, Gordon House, 10 Greencoat Place, London, SW1P 1PH. Tel: 020 7306 0606.

- (9) Epilepsy ~ the National Society for Epilepsy, Chalfont Saint Peter, Buckinghamshire, SL9 0RJ. Tel: 01494 601300.
- (10) Drugs and Alcohol helpline ~ Tel: 0800 776600
- (11) Downs Syndrome ~ Downs Syndrome Association, 153 Mitcham Road, London, SW17. Tel 020 8682 4001.

Children who are careless with their work, who lie or are dishonest, often exert a very negative pressure on their peers. Pupils may be influenced to follow such behaviour despite their own value-based upbringing, especially if those pupils are quite charismatic or dominant. Some schools have found that setting up “parenting” meetings, to address this issue, have been very helpful.

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ENGLISH

At junior level, SSEHV activities can be used as a basis for discussion, activities and work. Lessons can be based on the following sections:

- (1) Book 1, Lesson 1.2 and Lesson 1.6
- (2) Book 2, Lesson 2.17
- (3) The songs, “Never Tell a Lie” (Track 3) and “Human Values” (Track 7) can be found on SSEHV CD 1 and “Feeling Good” on CD 2. The latter song is about the dilemma involved when finding a wallet; whether to give it back or to keep it. In the end, the singer says that he has decided to give it back because he knows, “It’s not right.”

The first of the two above poems, “ACCURACY”, expresses the same sentiments. Deepak Fakey’s games (available through BISSE Ltd., Tel: 020 8429 2677) can also be used for stimulus. These excellent games are an important school resource as they provide endless entertainment as well as encouraging children to make their own informed decisions based on good values.

Children could be asked to talk about dishonesty: why they try to hide the truth, the consequences of their actions and how they can make amends for their behaviour. They could also discuss the importance of being ACCURATE in their work. The theme would give teachers an opportunity to emphasise spelling, punctuation, grammar and handwriting. Pupils can be asked to write stories/poems to encourage them to reflect on the theme of ACCURACY.

At lower secondary level, teachers can use SSEHV Book 3 as a basis of stimulus and discussion, in particular: Book 3, Lessons 3.2: “Truthfulness” and 3.19, “Honesty”. The second poem in the newsletter “Shining in My ACCURACY” can also be used as a basis for writing stories/ poems concerning the theme of ACCURACY. Songs from CD3 could also be used: 3.2, “Follow Your Heart”, 3.4: “Heart’s Song”, and 3.6: “Keeping Sober”.

SSEHV Book 4 can also be used, in particular Lessons 4.2: “ACCURACY”, 4.3: “Learning from Mistakes”, 4.4: “Introspection”, 4.5: “Reaction” and 4.6: “Who Am I?”

Songs from the CD4 could also be used:

- (1) “Each Thread I Add” (4.2)
- (2) “Move On” (4.3)
- (3) “Going Nowhere Fast” (4.4),
- (4) “It All Comes Back to Me” (4.5)
- (5) “Live As You Are” (4.6)

Stories could be based on their own experiences or could be fictional. A play could be written, either as a joint class project, or by individuals, to be presented at assembly on ACCURACY day. Pupils could be asked to write an honesty letter. This could be fictional or could be directed at someone with whom they have not been truthful. They could say what prompted them to be dishonest in the first place, how they have been feeling because of their behaviour and how they wish to make amends or apologise.

Pupils could consider the importance of accurate communication through writing and speech. Pupils could write a self-assessment diary, trying to be as ACCURATE and honest about themselves as they can (see SSEHV Book 4, p77). The teacher could point out the importance of standardised modes of spelling, grammar and punctuation as an aid to communication.

At GCSE level, pupils could be asked to write a talk that could be given in front of the WHOLE SCHOOL on ACCURACY DAY, on the importance of the value of ACCURACY. Topics could be based on the following quotes:

- “Truth is that which is the same for each person and at all times and places”
- “The truth will set you free”
- “Crime does not pay”
- “Know thyself”
- “Be yourself truthful”
- “Those who seek the truth by means of intellect and learning only get further and further away from it”
- “Let knowledge grow from more to more and thus be human life enriched”
- “Time waste is life waste”

Pupils could look at how the media can distort truth or create bias. Suitable material can be found in the form of articles and adverts from back copies of GCSE papers. Pupils could write to the editor of a paper, or a talk could be written for a radio station broadcast, complaining about an incident where something was not reported accurately. Suitable subjects might include:

- “The behaviour of young people on buses /shops”
- “Lack of respect for adults”
- “Petty theft”

Pupils could also be asked to write essays on topics concerning the theme, such as:

- “The day I owned up”
- “It’s not cool to steal”
- “The lie”

Pupils should be encouraged to explore the emotions that arise as a direct consequence of acts of dishonesty. Suitable topics could include:

- “The day I lied/exaggerated”
- “I may never know the truth”
- “Honesty is the best policy”

The English Literature syllabus can also be used in connection with the theme of ACCURACY. Examples include:

The character of Atticus, in “*To Kill a Mockingbird*” by Harper Lee, provides a positive and inspirational role model. Atticus uses his position as a defence solicitor to fight for the ACCURATE representation of facts against racist pressure to convict an innocent man. He risks much, including his own children’s approval, to follow the path of ACCURACY.

In “*Silas Marner*”, by George Eliot, Godfrey’s dishonesty over his paternity of Eppie leads to him losing her to Silas.

In “*Mice and Men*”, by John Steinbeck, Lennie tries to deceive George whenever he finds a mouse to pet, because he is afraid that George will take it from him. Deception plays an important part in the novel as a whole. Lennie accidentally kills Curly’s wife because he believes that if she makes a noise, George will find out that he has been talking to her.

Shakespeare uses the theme of deception in many of his plays. In “*Macbeth*”, Lady Macbeth encourages her husband to “look like the innocent flower but be the serpent under’t”. And in “*Romeo and Juliet*”, the lovers both die because they try to deceive their families so that they can be together.

In “*Animal Farm*”, George Orwell depicts how the pigs manage to gain and keep their position of power over the other animals through deception and trickery.

In “*An Inspector Calls*”, by J.B Priestly, the inspector’s role is important. He demonstrates how, if other characters looked honestly at their behaviour, they would recognise their accountability towards the suicide that he is investigating.

In poetry, William Blake in his poem “*London*”, and Wilfred Owen in his poems about war and its aftermath, try to paint an ACCURATE picture. They use realism to challenge romanticism in their poems.

At A/S and levels, many poems on the syllabus are concerned with ACCURACY, or lack of it.

In his “*Sonnet CXXX*”, Shakespeare aims at depicting his mistress in a way that challenges Romanticism. He opens the poem by stating that his mistress’ eyes “are nothing like the sun.” Pupils could be asked to compare Shakespeare’s view with that of Keats, for whom “Beauty is truth, truth is beauty.” They may also like to consider whether Tennyson’s truths are “commonplace” as Hopkins believed, or whether Christopher Ricks was correct to say that they were “profoundly simple”.

Many of Shakespeare’s plays deal with the theme of deception. Examples include *Othello*, *Hamlet*, *Romeo and Juliet*, *Midsummer Nights Dream* and *The Tempest*. Pupils could be asked to explore the theme by choosing one or more of his plays. They could consider how far

Shakespeare attaches importance to the value of ACCURACY. They could consider the factors that prompt dishonest behaviour and explore the consequences of such deception for the characters as whole. They could also examine how Shakespeare uses the theme of deception to create tension and drama.

Chaucer also provides material concerning the theme of ACCURACY. In *The Pardoner's Tale*, for example, the Pardoner is seen to have too much knowledge about the vices that he is condemning. Pupils could examine the passage from "the apostel wepyng seith ful pitously" to and "thanne wol he seye "Sampsoun, Sampsoun!" Pupils could consider the Pardoner's story, his narrative technique and the character of the Pardoner. They could look at the evidence which indicates that the Pardoner is not the moral man of God that he makes himself out to be.

RELIGIOUS EDUCATION

At junior level, children could listen to stories, draw pictures and talk about their experiences concerning the theme of ACCURACY. The following lessons from SSEHV Books 1 & 2 could be used:

From Book 1 - 1.2: "Telling the Truth", 1.5: "Love of Learning", 1.6: "Owning Up". From Book 2 - 2.3: "Love of Learning", 2.5: "Spirit of Inquiry", and 2.6: "Unity in Diversity."

The above poem, "ACCURACY", can also be used as stimulus.

The story of Peter and the cock crowing could be used to illustrate how we can feel bad about ourselves when we are not honest. The way St Peter denied Christ three times can be used as stimulus. The teacher could also ask the children to imagine what Peter felt like when he denied knowing Jesus. Pupils could enact out the story and give a performance on ACCURACY DAY in front of the WHOLE SCHOOL. The teacher could ask the children to imagine what values they need to practice in order for there to be truth. A flow diagram could be constructed and this could be displayed on ACCURACY DAY.

At secondary level, activities could be based on material from Book 3, Lessons 3.2: "Truthfulness", 3.4: "Spirit of Inquiry", 3.19: "Honesty" and 3.6: "Discernment", and on the second poem in this Newsletter, "Shining in My ACCURACY". Older classes could discuss the following quotations: "Be yourself truthfully" and "The beginning of wisdom is to be able to say I don't know."

At GCSE, students could examine the question of martyrdom; looking at people who have sacrificed their freedom and even their lives for the sake of being honest about their spiritual affiliation or in their quest for truth. The life and work of the Italian scientist Galileo would serve to illustrate this point. Pupils could research how he bravely strove for the right to have freedom to study, carry out experiments and to suggest new ideas without religious interference.

Examples can be drawn from different faiths related to the value of ACCURACY. Pupils could, for example, look at how religious extremists have not always represented the true teachings upon which their religion is based. They could reflect upon the quote by Hakuin (1683-1768), "Not knowing how near the truth is, people seek it far away -what a pity! They are like him who, in the midst of water, cries in thirst so imploringly."

At A/S and A levels, pupils could consider how far people from different religions and religious faiths are observing customs and ceremonies, through habit and ritual without being fully aware of their inner significance and the spiritual truths on which they are based. Suitable topics could include:

- (1) Explain the importance of being aware of the inner significance of ritual in spiritual practice
- (2) Metaphysics, as we know it today, makes use of both deductive and proper scientific reasoning.

Judge Thomas Troward was probably the highest acknowledged master of metaphysics in this century. He taught that each individual is responsible for his/her experiences. Each of us is a very important channel of energy and intelligence. Comment on Troward's remarks. How far do you agree/disagree with him?

PSHE

Pupils can also be asked to consider what is meant by the word ACCURACY and how far does the value of ACCURACY have implications for all aspects of our lives. Teachers could explain that the value of ACCURACY is one that embraces a large area and has many implications.

Teachers could initiate discussion concerning the theme of ACCURACY as interpreted in the following ways:

- (1) Freedom from mistake or error
- (2) Conformity to truth or to a standard or model and exactness
- (3) Correctness
- (4) Precision
- (5) Exactness
- (6) Authenticity
- (7) Truth or veracity
- (8) Closeness
- (9) Faithfulness
- (10) Fidelity
- (11) Carefulness

The quotations and poems that can be found earlier in this newsletter can be used as a basis for reflection and discussion. Pupils could discuss the importance of the value of ACCURACY in relation to the following:

- (1) "Truth is that which is the same for each person and at all times and places"
- (2) "The truth will set you free"
- (3) "Crime does not pay"
- (4) "Know thyself"
- (5) "Be yourself truthful"
- (6) "Those who seek the Truth by means of intellect and learning only get further and further away from it."
- (7) "Let knowledge grow from more to more and thus be human life enriched".
- (8) "Time waste is life waste".

Pupils could also look at how the media can distort truth or create bias. In particular, they could look at advertising on TV, videos and in magazines that try to promote products by inaccurate representation. The teacher could point out that it is easy to be manipulated into believing, for example, that you would not have friends unless you wore particular designer clothes or cut your hair in a certain way. This could lead to a discussion the importance of:

- (1) Being oneself
- (2) Not judging others or things by their appearance ~ not judging a book by its cover
- (3) The dangers of being a fashion groupie

Pupils can also be asked to consider what is meant by the word ACCURACY and how far does the value have implications for all aspects of our lives. Pupils could research and discuss the way that certain well known people have overcome difficulties in trying to be ACCURATE in some way.

Gareth Gates from Pop Stars would be a suitable example. Many children and young people followed the series and watched Gareth rise above his speech impediment not only to talk in front of millions of viewers but also to end in second place in the competition. He is now a well-known singer.

Other examples could include:

- Helen Keller, (see SSEHV Book 4: lesson 4.10),
- Louise Braille, (see SSEHV Book: 5 5.19).
- Also Leonardo da Vinci and Albert Einstein, who were dyslexic, and the physicist Stephen Hawking, who overcame his disability of motor-neurone disease to become a world-renowned and well-respected physicist/writer.

Pupils could enact plays based on the lives of actors/actresses who have had to struggle to comply with the value of ACCURACY. The topic could also be linked to awareness of disability, and in particular dyslexia, (see WHOLE SCHOOL). Talented dyslexic performers such as Cher, Whoopi Goldberg and Susan Hampshire could be used as inspirational figures.

Pupils could also consider the several dangers that may result from making generalisations. One example of the consequences of this could be that of creating stereotypes. Pupils could be warned against accepting comments that are emotive as they could be grossly inaccurate, and could be considered highly offensive. Suitable questions could be comment on the following statements:

- (1) “All Chinese and Japanese are small, so where did they find such tall volleyball players for the Olympic Games?”
- (2) “Amazon Amerindians have not developed their environment because they are lazy and unintelligent.” (See GEOGRAPHY section for alternate view.) The writer interviewing an Amerindian was surprised to find that the Indian spoke seven languages. Contrary to the writer’s expectations, the Indian also reported that he wanted to return to the jungle “to avoid hassle”. The Indian said that he considered the Indian lifestyle to be preferable to the western one with its quest for material possessions.)
- (3) Comment on David Waugh’s view that:
 - (a) “It is easy to accept stereotypes without realising what we are doing.”
 - (b) “The experience of seeing a situation for ourselves may alter the picture we have received through incomplete information from books, newspapers, television etc.”

- (c) “An important question is whether geographers should take a role in overcoming the problems of stereotyped images (on the basis of which, for instance, planning decisions are made) by helping to provide relatively unbiased information to improve knowledge and understanding.” (David Waugh ~ *Geography, an Integrated Approach* ISBN 0-17 444065-0).

Pupils could also consider how INACCURACY could have devastating consequences. Stimulus for discussion could be taken from the following observation: Computers have revolutionised the fighting of wars. GBU-27 bombs, for example, can be fired using laser-beam technology for precision ACCURACY. In practice however, pilot error, cloud and enemy gunfire made 25% of the GBUs miss their targets during the Gulf war.

DRAMA

At junior level, children could be divided into small groups and helped to work out a small sketch to illustrate the theme of ACCURACY.

At secondary level, pupils could perform plays concerning the theme of ACCURACY. These could be based on the problems suffered by those who lack ACCURACY with their senses. Examples could include those who suffer from dyslexia, blindness, deafness, Alzheimer’s disease, or some physical disability such as cerebral palsy or motor neuron deficiency.

Pupils at all levels could be inspired by the life story of the physicist Stephen Hawking who overcame his disability of motor-neurone disease to become a world-renowned and well-respected physicist/writer.

Other suitable examples could include:

- Helen Keller (Book 4, Lesson 4.10)
- Louise Braille (Book 5, Lesson 5.19)
- Leonardo da Vinci
- Albert Einstein

Pupils could enact plays based on the lives of actors/actresses who have had to struggle to comply with the value of ACCURACY. The topic could also be linked to awareness of disability, and in particular dyslexia, (see WHOLE SCHOOL). Talented dyslexic performers such as Cher, Whoopi Goldberg and Susan Hampshire could be used as inspirational figures.

GEOGRAPHY

At junior level, children can be taught that it is important to try to be accurate in their work when they are drawing maps or plans or giving directions.

Suitable games can be devised and played to illustrate this; for example, to find their way around obstacles blindfolded, based on directions given by the children. Basic orientation skills could be taught involving compass work and astronomy. The children could take part in a treasure hunt. They could look at satellite images of hurricanes. The teacher could explain how the accuracy of satellite information has helped to save lives. They could also learn about methods that predict and record the intensity of earthquakes, (with, for example, seismographs), and volcanic eruptions (through observations and chemical tests).

At secondary level, children could explore the topic of ACCURACY through:

- (1) Map reading – compass use, contour map work, and orientation exercises. Suitable questions could include:
 - (a) List the methods used to show relief features on maps.
 - (b) What is a contour line?
 - (c) What are hachures? Explain how the Lehmann system is applied.
 - (d) How do Defour maps differ from maps using the Lehmann system?
- (2) Meteorology ~ barometers (mercurial and aneroid), thermometers, hydrometers, anemometers, tachometers, etc. A suitable question would be: “By the mid 1990s, the unpredictable landfall of a hurricane could be anticipated within 160km (100 miles), four times the accuracy of the 1970s. Consequently, when Hurricane Andrew hit southern Florida in 1992, there was sufficient time to evacuate 1.5 million people, and only thirteen lives were lost. Explain fully the implications of ACCURATE modern technology on human life on the saving of human life.
- (3) Earth movements ~ explain the importance of accurate monitoring of earth tremors in the prediction of earth movements and volcanic eruptions. Suitable questions would be:
 - (a) What are isoseismal lines?
 - (b) What is the Richter scale?
 - (c) How does a seismograph work?

Pupils could do a project entitled “Finding our Way”. Other suitable questions to guide the project could include:

- (1) Before 1900, a ship’s compass was a vital piece of equipment for navigators to find their way. After their first air flight in 1903, pilots had to rely on their instincts and landmarks on the ground. Explain the basis of orientation before 1900.
- (2) Between 1901 and 1903, 50 merchant ships were equipped with radiotelegraphs. Explain how radio telegraphs helped navigation.
- (3) In 1908, the gyroscopic compass was produced in Germany and later perfected by the American Elmer Sperry. It was unaffected by metals and points to true – rather than magnetic North. Explain the principle lying behind the gyroscope.
- (4) After the sinking of the Titanic in 1912, the French scientist Paul Langevin used quartz crystals in 1915 to transmit very short sound waves. These could then be bounced back from any object in the vicinity. Describe the developments in ultrasonic technology that lead to the development in 1920 of sonar (Sound Navigation Ranging) as a means of underwater detection.

- (5) The Swiss-American engineer, Frederick Kolster, developed an experimental radio compass system with transmitters off the jersey coast. Navigators only had to note in quick succession the bearings of two signals in order to determine their position roughly. Describe the development of this system until 1928 when the USA was “webbed” with a “radio range” network of stations that guided a pilot from point to point.
- (6) In 1928, John Logie Baird claimed a patent for radar. He described it as “a method of viewing an object by projecting upon it electromagnetic waves of short length. Outline the major developments in this field from the setting up of radio detection and ranging in 1935 to post-war developments, such as Marconi’s early warning and detection system.
- (7) In 1967, BEA Trident inaugurated the first blind-landing system for civilian aircraft. Explain how these systems rely on two beams of radio pulses.
- (8) The USA developed inertial navigation as an accurate means of under water navigation. In 1958, the Nautilus was able to cross the North Pole in a 96 hour, 2900-km, (1800-mile), journey beneath the ice pack. Explain how this was done.
- (9) Describe the developments in accurate navigation between the launching of the Transit 1, the world’s first navigation satellite, in 1960 and the Global Positioning System of 1970. What were the implications for yachtsmen and hikers?
- (10) In 1981, Sodor (Sonic Detection and Radar) was set up to measure wind gusts and air currents stirred by aircraft movements. Why was this important?
- (11) By the 1990s, a computer-based Traffic Alert and Collision Avoidance system was being developed. Explain its importance.
- (12) Describe how global positioning satellites of today can:
 - (a) Guide tankers
 - (b) Programme cars for any destination
 - (c) Perform other tasks

At GCSE and A/S levels, pupils could focus on collecting data. A suitable example would be river measurements ~ calculating speed, volume and ways in which water travels in its aim of reaching the lowest level by looking at run-off, streams and rivers.

Pupils could also be asked to consider the importance of ACCURACY in planning. One example would be in management projects. A suitable question would be: “Explain the importance of ACCURATE data in man’s attempts to carry out agriculture in inhospitable areas”. Refer directly to strategies such as terracing, irrigation, and reclamation projects, giving specific examples from areas that you have studied.

A suitable example would be the Sathya Sai Drinking Water Project, a scheme created by the Indian educationalist and social worker Sathya Sai. This now supplies more than one million people with clean water in the Indian state of Andhra Pradesh. The project covers more than 700 villages in the Ananthapur district. The supply consists of four schemes:

- (1) Comprehensive Water Supply Schemes involving infiltration wells, collection wells and associated pumping behind the Chitravati Balancing Reservoir at Peddakotla and Chinnakotla villages. Sources for infiltration wells include the Pennar and Hagari rivers.
- (2) Direct pumping from Pennahobilam Balancing Reservoir (PABR) and treatment through rapid sand filtration.
- (3) Comprehensive Water Supply Schemes (CPWS) through seven summer storage tanks ranging up to 100 acres which tap water from the Tungabhadra high level canal, when water flows in the canal.

- (4) The Protected Water Supply Scheme (PWS) which covers 290 villages. It involves drilling deep bore wells, construction of storage tanks and installation of pipe networks.

The special features associated with the project had to be planned with great ACCURACY. These include:

- (1) The laying of more than 2,000 km of AC, CI, MS, and PVC pipelines. The diameters of these range from 80mm to 600 mm.
- (2) The construction of 43 pumps from 100,000 litres to 25 million-litre capacity.
- (3) The construction of 20 balancing reservoirs at the top of hillocks with capacities ranging from 300,000 to 1 million litres.
- (4) The construction of 275 overhead reservoirs, with capacities ranging from 40,000 litres to 300,000 litres.
- (5) The construction of 125 ground level reservoirs, with capacity ranging from 20,000 litres to 80,000 litres
- (6) The installation of more than 1500 pre-cast concrete cisterns of 2,500 litre capacity, with provision for four taps to be used by the villagers.

Other current water projects being initiated and directed by Sathya Sai Baba include two in the drought areas of Medak and Mahboobnagar districts in Andhra Pradesh. About 400 villages will benefit from the scheme. There are also plans for a project further north in India.

GCSE and A/S projects could also be seen as an opportunity for teachers to encourage students to carry out and present their work in a more ACCURATE manner. Teachers could advise pupils to learn how to pace themselves, so that the work is not rushed and slap dash, and how to break down project work into manageable sections.

At GCSE and A/S levels, teachers can echo course guidelines by stressing that it is the PROCESS and not the PRODUCT that is the important part of research. In this way, they can encourage their students to be honest about their findings when they are doing their coursework, rather than distorting them to agree with whatever theory that they are trying to prove.

At A/S and A level, pupils could consider how far it is sensible to be ACCURATE about how much to produce in time, so that there is no, or little, over-production or surplus. A suitable question would be: What is "Rationalisation for Efficiency"? Describe the "Just in time" policy. What are the advantages and problems associated with it?

Pupils could also consider the several dangers that may result from making generalisations. One example of the consequences of this could be that of creating stereotypes. Pupils could be warned against accepting comments that are emotive as they could be grossly inaccurate, and could be considered highly offensive. Suitable questions could be comment on the following statements:

- (1) "All Chinese and Japanese are small, so where did they find such tall volleyball players for the Olympic Games?"
- (2) "Favelas are shanty settlements whose inhabitants have no chance of improving their living conditions." Show how this statement does not take into account that some have been able to benefit from self-help schemes.
- (3) "The inhabitants of *favelas* can only survive through a life of crime." Give evidence to show the discrepancies in this argument.

- (4) An author's experience in Brazil (quoted by Waugh) contradicts the stereotypical view that the Amazon Amerindians have not developed their environment because they are lazy and unintelligent. The writer interviewing an Amerindian was surprised to find that the native spoke seven languages. Contrary to the writer's expectations, the Indian also reported that he wanted to return to the jungle "to avoid hassle". The Indian said that he considered the Indian lifestyle to be preferable to the western one with its quest for material possessions, often only achieved by winning the "rat race".

Comment on David Waugh's view that:

- (a) "It is easy to accept stereotypes without realising what we are doing."
- (b) "The experience of seeing a situation for ourselves may alter the picture we have received through incomplete information from books, newspapers, television etc."
- (c) An important question is whether geographers should take a role in overcoming the problems of stereotyped images (on the basis of which, for instance, planning decisions are made) by helping to provide relatively unbiased information to improve knowledge and understanding." (David Waugh ~ *Geography an Integrated Approach* ISBN 0-17 444065-0)

HISTORY

At junior level pupils could look at ways of keeping time through the ages. The teacher could take the opportunity to emphasise the importance of punctuality, or keeping time with ACCURACY. They could reflect upon the following quote: "Time wasted is life wasted" (Sathya Sai).

They could study inspirational figures in History whose lives have reflected their commitment to the value of ACCURACY. Suitable examples could include

- (1) Leonardo da Vinci
- (2) Scientists during the Age of Learning
- (3) Explorers and navigation ~ Christopher Columbus, Vasco da Gamma

They could also learn about dyslexic military/political strategists (see WHOLE SCHOOL project) such as General George Patton, Winston Churchill and Michael Heseltine. Pupils could discuss the difficulties presented to individuals, in terms of ACCURACY, who are dyslexic and suggest how these leaders may have overcome them.

At lower secondary level, children can be taught about the importance of ACCURATE reporting of events. A historical event could be enacted from different perspectives. This would help children to understand about bias in reporting and develop a better understanding into the effect of more subtle forms of dishonesty.

At GCSE level, original source material can be studied within their chosen syllabus. Accounts from these sources can be compared and contrasted and examined for bias. Suitable topics could include Chartism, the 1832 Reform Act, child labour and the 19th century Factory and Mines Acts, Roosevelt's "New Deal", India's independence, the struggle against apartheid and women's rights.

At A/S level, pupils' original source material can be studied within their chosen syllabus. Accounts from these sources can be compared and contrasted and examined for bias, pupils

could look at long term struggles to bring peace into certain areas of the world, such as Ireland, the Arab/Israeli conflict and instability in post-colonial Africa.

Pupils could also do a project on ways of measuring time. Suitable guiding questions could include:

- (1) ACCURACY in international timekeeping ~ Greenwich Meantime:
 - (a) Describe how time varied from place to place until the coming of the railways.
 - (b) Why did variations in time cause confusion when the timetables were set up?
 - (c) An international time standard was drawn up in 1884, keyed to the Meridian or line of longitude that passes through Greenwich ~ hence, Greenwich “mean time”. What was the benefit of this?
 - (d) It is called mean time because it is based on the solar day, which varies in accordance to the earth’s elliptical orbit, and so has to be averaged. GMT was redesignated as Universal Time in 1935 when the quest for greater precision began in order for us to communicate with others in the world. Explain the world changes that made this necessary.
- (2) ACCURACY through computer technology ~
 - (a) Describe the rise in ACCURATE computer technology in terms of links with other countries.
- (3) Clock ACCURACY ~
 - (a) The best timekeeper available in the 1920s was the electromagnetic clock, built in 1921 by W.H Shortt, a British railway engineer. Shortt’s clock was ACCURATE to one second in ten years and was able to identify slight irregularities in the orbit of the earth. Describe the importance of this to British industry and trade.
 - (b) Advances in physics in the wake of the Second World War led to proposals for the atomic clock scaled to the radiation vibrations of certain atoms. By June 1955, a caesium atomic clock with an accuracy equivalent to one second in 300 years was working reliably at the National Physics Laboratory in Teddington, near London. Using it, an exact definition of the second was arrived at: 9,192,531,770 caesium vibrations. Using a clock that counted the vibrations of the ammonia atom, the US Naval Laboratory in Washington narrowed the ACCURACY to one second in 1.7 million years. By 1978, atomic clocks the size of radios were on the market, thanks to microelectronics. Explain the social, economic and political implications of such advances in accurate monitoring of time.

ART

At junior level, children could make contour maps or self-portraits of their face or feelings (see SSEHV Book 4 p92). They could use any medium or style that they choose. They could then create a collage with all the faces put together. These could be displayed on ACCURACY DAY in a prominent place. Pupils could colour in the poster “Mountain of Truth” (SSEHV Book 1: p98 and Book 2: p90). They could write values related to truth on the milestone. Pupils could paint or draw pictures concerning something which involves the value of ACCURACY.

Examples could include:

- (1) Spider webs
- (2) Suspension bridges
- (3) Archery practice
- (4) Slalom skiing

At junior and lower secondary level, pupils could design and create posters to illustrate the theme of ACCURACY. Each child could choose a value related to ACCURACY. One example would be to take the related value of honesty. Pupils could divide the poster into two halves with one side depicting the negative effects of dishonesty (sadness, worry etc.) and the other illustrating the positive effects of honesty (inner peace, joy etc.) Sketching practice can also be used to show that accurate representation takes awareness and patience. Parallels can be drawn with ACCURACY in life, in terms of not exaggerating and trying to be accurate in what we say. Pupils could paint or draw a picture symbolising their Higher Self.

At secondary level, pupils could do a project based on ways we achieve ACCURACY. They could do sketches, drawings, paintings or models of:

(1) A clock powered by:

- (a) Battery
- (b) Water
- (c) Vegetable
- (d) Solar power
- (e) Electromagnetism
- (f) Caesium
- (g) Atomic energy (see sections on HISTORY and PHYSICS)

(2) Meteorological instruments:

- (a) Thermometer
- (b) Wind vane
- (c) Stephenson's screen for keeping meteorological instruments
- (d) Barometer
- (e) Hydrometer

(3) Navigation instruments:

- (a) Compass
- (b) Sextant
- (c) Wind

(4) Mathematical instruments:

- (a) Ruler
- (b) Compass
- (c) Protractor (see DESIGN TECHNOLOGY)

These could be displayed on ACCURACY DAY (see WHOLE SCHOOL).

Pupils could also focus on the work of the dyslexic artists Leonardo da Vinci and Walt Disney to show how they strove for accurate representation, despite the challenges presented by their dyslexic condition.

At GCSE level, pupils could look at realism and the artistic skills that are needed to create life-like representations. Teachers can advise pupils to break down and simplify the task in front of them. They can look at it from different perspectives: light, shape, texture, form and movement. This exercise would not only give pupils an opportunity to develop a deeper understanding of what they are drawing, through exploring different skills, but would also help them to find out where their strengths and interests lie. Space, light and tone can be studied through the medium of linear perspective and chiaroscuro.

At A and A/S levels, pupils could study the work of the theoretician and architect, Leon Battista Alberti, and the architect and painter, Filippo Brunelleschi, and examine the statement by Leonardo da Vinci that “Perspective is the rein and rudder of painting.”

The notebooks of Leonardo da Vinci and Albrecht Durer’s Treatise on Measurement and Proportion could also be used to show how accuracy, or honest representation, is a skill that needs to be practised.

DESIGN TECHNOLOGY

Pupils could design and make inspirational objects for ACCURACY DAY. These could include badges, a school plaque (see QUOTES) or some other representation of ACCURACY through a sculpture, collage, tapestry or other medium (see WHOLE SCHOOL). They could make contour maps or self-portraits of their face or feelings (see Book 4, p92). They could use any medium or style that they choose. They could then create a collage with all the faces put together. These could be displayed on ACCURACY DAY in a prominent place. They could design and make instruments that are used for ACCURACY. Suitable examples would be:

- (1) A clock powered by:
 - (a) Battery
 - (b) Water
 - (c) Vegetable
 - (d) Solar power
 - (e) Electromagnetism
 - (f) Caesium
 - (g) Atomic energy (see sections on history and physics).
- (2) Meteorological instruments:
 - (a) Thermometer
 - (b) Wind vane
 - (c) Stephenson’s screen for keeping meteorological instruments
 - (d) Barometer
 - (e) Hydrometer
- (3) Navigation instruments:
 - (a) Compass
 - (b) Sextant
 - (c) Wind
- (4) Mathematical instruments:
 - (a) Ruler
 - (b) Compass
 - (c) Protractor
- (5) Music:
 - (a) Metronome
 - (b) Conductor’s stick

These could be displayed on ACCURACY DAY (see WHOLE SCHOOL)

MATHS

At all levels, pupils can be encouraged to present their work accurately, for example when using a ruler, compass, protractor, tachometer and so forth.

At junior level, children could be given a sticker when they have shown that they have tried to remember and apply the value of ACCURACY over a particular set task. These stickers could be placed on a large graph. The graph could be analysed at the end of a suitable period.

Teachers could stress the importance of ACCURACY as a foundation for Mathematics. Examples of areas that could be covered include:

- (1) Measurement
- (2) Calculations
- (3) The importance of having good tools such as protractor, ruler, sharp pencil, stable compass, calculator, etc.
- (4) The importance of learning tables and practising them.

Pupils could suggest why ACCURACY is important. Their comments could be placed on a flow diagram chart, to be displayed on ACCURACY DAY. A flow chart to test accuracy in speech can be found in Book 4, p66. Through this exercise, pupils can learn how to apply values to answer the questions.

At upper junior and lower secondary levels, pupils could explore the relationship of mathematics to the following related definitions of the value of ACCURACY:

- (1) Freedom from mistake or error
- (2) Conformity to truth or to a standard or model, and exactness
- (3) Correctness
- (4) Precision
- (5) Exactness
- (6) Authenticity
- (7) Truth or veracity
- (8) Closeness
- (9) Faithfulness
- (10) Fidelity
- (11) Carefulness

Pupils could also devise surveys concerning ACCURACY. The findings can be analysed and displayed as both quantitative and qualitative evidence in a prominent place in the school on ACCURACY DAY or for longer. A variety of types of graphs can be used to display the evidence such as bar, line, flow, scatter and pie diagrams. The surveys could be conducted in the form of questionnaires. Pupils can be asked to tick the relevant box/boxes and write comments in the appropriate places.

Suitable questions could include:

- (1) “Do you think that it is OK to take things that do not belong to you? Never, hardly ever, sometimes, always?”
- (2) “Do you consider that you tell the truth: always, mostly, sometimes, never?”
- (3) “How do you feel when you have not been entirely honest? Upset, sad, disappointed, not bothered.”
- (4) “Why do you think people steal things? Need, greed, envy, status, other reasons?”
- (5) “Why do you think that people are not always honest in what they say? Fear, want to be liked, embarrassment, other reasons?”
- (6) “Do you believe that it is justifiable to tell “white lies”: sometimes, always, never?”

BIOLOGY

At junior level pupils could look at the importance of ACCURACY in nature. Examples could include:

- (1) Spiders in the formation of their webs
- (2) Ants and their trail lines to search for or bring food back to the nest
- (3) Birds and their navigation skills.

They could also write an essay based on their own experiences or on a set topic such as “Creatures in the world that do things with ACCURACY”. Teachers could tell children about the problems suffered by those who lack ACCURACY with their senses, suffering from dyslexia, blindness, deafness, Alzheimer’s disease or some physical challenge such as cerebral palsy or motor neuron deficiency. Pupils at all levels could be inspired by the life story of the physicist Stephen Hawking who overcame his disability of **motor-neuron** disease to become a world renowned and well respected physicist/writer.

At lower secondary levels, teachers could introduce the value of ACCURACY by suggesting to pupils that it is important to know how things really work within our bodies and in nature, so that we can have a truer picture of things. They can be given examples of people who have encouraged others to take a closer look at the natural world. Projects could be written on some of these such as the Greek philosopher, Aristotle; the Roman, Pliny the Elder; the German monk, Albertus Magnus and the Dutchman, Antoni van Leeuwenhoek, who made his own microscope.

Pupils could also be inspired in their quest for truth by stories of others that gave importance to the value of ACCURACY. A suitable example would be the great Renaissance humanist Leonardo da Vinci, who decided that he would have to study the skeletal, musculature and blood circulation systems in order that he could paint accurate pictures of the human body.

At GCSE level, the topic of ACCURACY can be explored through the study of the human body. Suitable questions could include:

- (1) The brain - how can damage or malfunction of the brain prevent ACCURACY in:
 - (a) Co-ordination
 - (b) Eyesight
 - (c) Speech
 - (d) Hearing
 - (e) Hand-eye co-ordination
 - (f) Balance

- (g) Conditions such as motor neuron disease and cerebral palsy?
- (2) Blood circulation - how does the heart persevere in pumping the vital blood round the body even to the body extremities? Pupils could look at the obstacles that the heart has to work against such as gravity and poor diet causing the blood vessels to restrict.

In the study of Zoology and Botany, pupils could also consider the importance of using natural predators, as opposed to sprays, as an ACCURATE, as well as less harmful, method of controlling pest attacks. One example would be the *pricarciiformosa* wasp that is selective and ACCURATE in pest control. Ladybirds and lacewings would also be suitable to study.

At A/S and levels, pupils could look at the human body. Suitable examples would include:

- (1) The brain – how can damage or malfunction of the brain prevent ACCURACY?
- (a) Co-ordination – describe the effects of cerebral palsy
 - (b) Hearing – explain deafness and tinnitus.
 - (c) Eyesight – explain the difference between long and short-sightedness.
 - (d) Speech - explain dumbness and stammering.
 - (e) Memory – how does the forebrain effect memory?
- (2) The nervous system - what causes motor neuron disease?
- (3) Blood circulation - how does the heart ACCURATELY pump the vital blood round the body even to the body extremities? Pupils could look at the obstacles that the heart has to work against such as gravity and poor diet causing the blood vessels to restrict.
- (4) Hormones:
- (a) Explain why ACCURACY is important in the production of hormones in pregnancy and the menstrual period.
 - (b) Describe how the follicle stimulant hormone stimulates the ovaries to produce graffian follicles. What is the effect of the subsequent production of oestrogen?
 - (c) After pregnancy, levels of oestrogen drop and progesterone, which causes the production of the hormone oxytoan, causes the uterus to contract so that the mammary glands produce milk. Describe this process in detail.
 - (d) The anterior lobe of the pituitary gland produces progactin which mammary glands use to produce milk. How is ACCURACY regulated here?
- (5) Enzymes:
- (a) Explain why enzymes are specific.
 - (b) Outline the 'Lock and Key' theory.
 - (c) Draw a diagram to illustrate how the sub-straight molecule that is being broken down will fit exactly only into a specific enzyme, so the enzymes do not get out of control.
 - (d) Explain fully why, if there was not an ACCURATE fit, everything in the body would be broken down.
 - (e) Describe and explain the delicate balance in the synapses (nerve junctions).
 - (f) Outline the process whereby the transmitter substance, acetyl choline, is shot into synapses. Explain how it would cause a merging of nervous impurities if it were left in the synaptic cleft and not broken down by enzyme cholines and ethanoic acid.
 - (g) Why is ACCURACY of paramount importance in the field of genetics? Give specific examples to explain your answer.

CHEMISTRY

At junior level, pupils could be asked to describe different substances with as much accuracy as they can. Water could be described as flowing, wet, able to change form, etc. Pupils could make a list of instruments that are used for measuring and quantifying with ACCURACY, such as a test tube, pipette etc. Teachers could stress the importance of putting the right amount in to make the correct chemical mix etc. Other values such as patience and forbearance can be introduced here as the teacher encourages pupils to accept that attaining ACCURACY in their experiments may take time

At secondary level, the theme of ACCURACY could be introduced as pupils study mixtures. They could, for example, look at the melting and boiling points of various substances. Simple distillation and fractional distillation can be studied. The pupil can learn from observation that mixtures can be separated by physical methods if one is ACCURATE about attaining the individual temperature at which each liquid should be boiled off.

In the study of acids and alkalis, the teacher can emphasise the importance of using an ACCURATE universal indicator. Pupils could experiment with growing plants in soil with differing pH factors in order to understand that wrong pH means poor growth. They could make a table to show different plants and the pH factor of the soil that they grow best in. Pupils could take pH samples of the soil around the school to ascertain which plants would grow best in certain locations.

At GCSE level, pupils could explore the theme of ACCURACY in their study of alkali metals. They could look at the melting and boiling points of metals such as lithium and caesium. They could do experiments where the rate of reaction varies according to the temperature. A suitable example would be that of sodium thiosulphate and HCl. Pupils can measure how long it takes a black mark to disappear through cloudy sulphur. The reaction can be repeated at different temperatures.

A suitable question would be - Look at the following table:

TEMPERATURE	20 degrees	25 degrees	30 degrees	35 degrees	40 degrees
Time taken for	193	151	112	87	52
Mark to disappear (seconds)					

What do these results show?"

At A/S and A level, the theme of ACCURACY could be explored by looking at how Chemistry has been usefully applied to the ACCURATE measurement of time. Suitable question could include:

- (1) A clock was invented in 1969 that counts the vibrations of the ammonia atom. The US Naval Laboratory in Washington narrowed the ACCURACY to one second in 1.7 million years. Explain the chemistry involved in such a process.
- (2) By 1978, atomic clocks the size of radios were on the market thanks to microelectronics. In 1969, Seiko launched the first quartz watch. It wedded a quartz movement with new microelectronic technology and a light emitting diode (LED) display. Describe and explain how lines of chemicals glow when an electric current is passed through them.

PHYSICS

Pupils could consider the difficulties involved in making ACCURATE calculations as to the forces and stresses involved in a particular construction or experiment. They could do experiments involving the forces in arches.

As part of their contribution to disability awareness (see WHOLE SCHOOL project) students could research the life and achievements of the dyslexics Albert Einstein, Thomas Edison and Alexander Graham Bell. Their findings could be displayed on ACCURACY DAY. Pupils could also look at pioneering inventions that have helped overcome some disability. An example of this could be Walt Woltose's Voice Synthesiser, which has enabled people with nervous and muscular disorders, such as multisclerosis to communicate with others in a clearer way. Pupils at all levels could be inspired by the life story of the physicist Stephen Hawking who overcame his disability of motor-neurone disease to become a world renowned and well respected physicist and writer.

At junior level, teachers can encourage pupils to be accurate in readings; to take care over what they do and to do it with concentration and awareness. They could study the life of Newton and look in particular at the way he constantly repeated experiments to obtain ACCURATE readings. A link could be made here between the value of ACCURACY, patience and forbearance.

They can also remind pupils that the spirit of enquiry has driven great physicists; that they are driven to investigate how the laws of the universe really operate. Leonardo da Vinci could be cited here. Pupils could be told how he sought to gain knowledge through his own experience by patiently observing the forces of nature in operation. They could look at his achievements in inventing a parachute, a plane and a diving suit with such ACCURACY that modern-day replicas have successfully proved that these inventions work.

They could also point out that some great scientists were prepared to be ridiculed, persecuted and even killed for the sake of ACCURACY. The life and work of the Italian scientist Galileo would serve to illustrate this point. Pupils can be told how he bravely strove for the right to have freedom to study, carry out experiments, and suggest new ideas without religious interference.

At lower secondary levels, the theme of ACCURACY can be introduced through the study of instruments used for measuring or precision. Suitable questions could include:

- (1) Time: Find out and write up about the importance of physics in paving the way for greater accuracy in the measurement of time. Base your work on the following information:
 - (a) The electromagnetic clock, built in 1921 by W.H Shortt, a British railway engineer, was accurate to one second in ten years. The clock was even able to identify slight irregularities in the orbit of the earth. Why do you think a railway engineer invented a clock?
 - (b) Advances in physics in the wake of the Second World War led to proposals for an atomic clock scaled to the radiation vibrations of certain atoms. How do you think the vibrations were measured?
 - (c) By June 1955, a caesium atomic clock with an accuracy equivalent to one second in 300 years was working reliably at the National Physics Laboratory in Teddington, near London. Using it, an exact definition of the second was arrived at: 9,192,531,770

caesium vibrations. Why do you think people wanted to know the time with such precision?

- (d) By 1978, atomic clocks the size of radios were on the market thanks to microelectronics. Explain what is meant by microelectronics.
- (e) In 1969, using a clock that counted the vibrations of the ammonia atom, the US Naval laboratory in Washington narrowed the ACCURACY to one second in 1.7 million years. Explain what do you understand by the word “vibration”?

(2) Architecture:

- (a) Why is building with ACCURACY important?
- (b) How useful have the following been in improving ACCURACY:
 - i. Plum line
 - ii. Spirit level
 - iii. The silicon chip
 - iv. Knowledge of stresses and forces.

At GCSE level, the same topic can be explored in more depth. Pupils could reflect upon the need for increasing ACCURACY as a response to new technological advances.

Suitable examples could include automatic equipment on trains, planes, submarines, space shuttles and satellites orbiting earth. Pupils could do a project entitled “Finding our Way”.

Suitable questions to guide the project could include:

- (1) Before 1900, the ship’s compass was vital to navigators to find their way. After the first air flight in 1903, pilots had to rely on their instincts and landmarks on the ground. Explain the basis of orientation before 1900.
- (2) Between 1901 and 1903, 50 merchant ships were equipped with radio telegraphs. Explain how radio telegraphs helped navigation.
- (3) In 1908, the gyroscopic compass was produced in Germany and later perfected by the American Elmer Sperry. It was unaffected by metals and points to true, rather than magnetic, North. Explain the principal lying behind the gyroscope.
- (4) After the sinking of the Titanic in 1912, the French scientist Paul Langevin used quartz crystals in 1915 to transmit very short sound waves. These could then be bounced back from any object in the vicinity. Describe the developments in ultrasonic technology that lead to the development in 1920 of Sonar (Sound Navigation Ranging) as a means of underwater detection.
- (5) The Swiss-American engineer, Frederick Kolster, developed an experimental radio compass system with transmitters off the Jersey coast. Navigators only had to note in quick succession the bearings of two signals in order to determine their rough position. Describe the development of this system until 1928 when the USA was “webbed” with a “radio range” network of stations that guided a pilot from point to point.
- (6) In 1928, John Logie Baird claimed a patent for radar. He described it as “a method of viewing an object by projecting upon it electromagnetic waves of short length.” Outline the major developments in this field from the setting up of radio detection and ranging in 1935 to post-war developments, such as Marconi’s early warning and detection system.
- (7) In 1967, BEA Trident inaugurated the first blind-landing system for civilian aircraft. Explain how these systems rely on two beams of radio pulses.
- (8) As an accurate means of under water navigation, the USA developed inertial navigation. In 1958, the Nautilus was able to cross the North Pole in a 96 hour, 2900km (1800-mile) journey beneath the ice pack. Explain how this was done.

- (9) Describe the developments in accurate navigation between the launching of Transit 1, the world's first navigation satellite in 1960 and the Global Positioning System of 1970. What were the implications for yachtsmen and hikers?
- (10) In 1981, Sodor (Sonic Detection and Radar) was set up to measure wind gusts and air currents stirred by aircraft movements. Why was this important?
- (11) By the 1990s, a computer-based Traffic Alert and Collision Avoidance System was being developed. Explain its importance.
- (12) Describe how global positioning satellites of today can:
 - (a) Guide tankers
 - (b) Programme cars for any destination
 - (c) Perform other tasks

At A/S and A level, pupils could study ACCURACY through time keeping. Teachers could initiate the work with a discussion on the importance of keeping ACCURACY in time. Suitable questions could include:

- (1) The rigours of the trenches during the First World War led to the general adoption of the wristwatch. Describe the mechanisms of the self-winding watch as designed by John Harwood in 1924.
- (2) The first water proof watch was produced in 1928. What changes were made to the original design to make it waterproof?
- (3) In the late 1930s, the first battery powered watch was produced. It ran on a two-cell battery, was lighter than a mechanical watch, and did not tick. Explain with the aid of diagrams, the mechanism of battery powered watches and clocks.
- (4) In 1929, Warren Alvin Marrison built the first quartz clock. Explain how such clocks can be ACCURATE within a thousandth of a second.
- (5) In 1969, Seiko launched the first quartz watch. It wedded a quartz movement with new microelectronic technology and a light emitting diode (LED) display.
 - (a) Describe and explain how lines of chemicals glow when an electric current is passed through them.
 - (b) Explain how the molecules of the LED rearrange themselves in response to an electric current.
 - (c) How can this knowledge be practically applied to other instruments of measurement, such as stop watches, alarm clocks, calendars and calculators?

MUSIC

At junior level, teachers can use the following songs from SSEHV CDs to illustrate the theme of ACCURACY: CD 1, Track 2, 'Never Tell a Lie' and CD 2, Track 16, 'Self Control'. Songs from CD 4 could also be used: 'Each Thread I Add' (4.2), 'Move On' (4.3), 'Going Nowhere Fast' (4.4), 'It All Comes Back to Me' (4.5), and 'Live as You Are' (4.6).

The topic of ACCURACY could be introduced through exercises involving keeping time, such as:

- (a) Following a regular beat by clapping
- (b) Being guided by a metronome
- (c) Using or following a baton

Pupils could take turn in conducting the rest of the class. The teacher could ask the pupils to play together without a conductor so that they can directly experience the practicality of being conducted whilst playing together.

At secondary level, pupils could practice:

- (a) Notation
- (b) Writing music
- (c) Sight-reading
- (d) Scales

Pupils could be encouraged to observe ACCURACY with their practical skills such as voice training and music scales. Teachers can also stress that the more that pupils read and listen carefully to music the more likely they are to reproduce it in an accurate way. They could also be encouraged to view any 'obstacles' to their musical progress or ability to perform as actually beneficial, in the long run, to their training. For example, rather than being put off by another singer/musician's inability to perform well, the pupil could use it as a training exercise to further develop his/her own powers of concentration. Singing in harmony can be used as a practice to develop ACCURACY through concentration and focus.

At GCSE and A/S levels, pupils can be encouraged to be HONEST about the sources of their inspiration. Music involving great precision or ACCURACY could be studied. Suitable examples include Indian ragas with their complex rhythms, African music and Taize music with multiple and interlaced harmonies. Teachers could emphasis the importance of regular and careful practice of scales and pieces in order to play a piece.

LANGUAGES

At lower secondary level, pupils could enact a play based on the theme of ACCURACY. Key words related to ACCURACY could be displayed in a spider diagram (see Dictionary Definitions at the beginning of this Newsletter.) Each child could be responsible for translating and writing up one of the related meanings.

At GCSE level, pupils could write about creatures and the importance they attach to ACCURACY. Examples could include:

- (a) Spiders in the formation of their webs
- (b) Ants and their trail lines to search for or bring food back to the nest
- (c) Birds and their navigation skills

They could also write an essay based on their own experiences or tell the story of a particular individual or group who strove to represent the world with ACCURACY, such as:

- (a) Mathematician
- (b) Scientist
- (c) Astronomer
- (d) Biologist
- (e) Engineers

The following related definitions of the value of ACCURACY could be translated:

- (a) Freedom from mistake or error
- (b) Conformity to truth or to a standard or model, and exactness
- (c) Correctness
- (d) Precision
- (e) Exactness
- (f) Authenticity
- (g) Truth or veracity
- (h) Closeness
- (i) Faithfulness
- (j) Fidelity
- (k) Carefulness

Pupils could also devise surveys concerning ACCURACY.

At A/S and A level, pupils could write an essay or a talk on the theme of ACCURACY.